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Ellisembia karadkensis sp. nov. from southern Western Ghats, India

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Abstract— A new species, *Ellisembia karadkensis* is described from *Bambusa bambos* culms as a saprobe. It differs from other *Ellisembia* species in possessing simple or (often) Y-shaped branched conidia with long flagelliform apical appendages. A morphological comparison is made with similar *Ellisembia* species, and with those restricted to bamboo. A new combination, *E. magnibrachypus*, is proposed for *Sporidesmium magnibrachypus.*

Key words— anamorphic fungi, dematiaceous hyphomycete, Kerala

Introduction

Subramanian (1992) erected the genus *Ellisembia* during his reappraisal of *Sporidesmium* Link and morphologically similar taxa. Subramanian considered the type of septation of conidia, the nature, regularity and other features of the percurrent proliferations of conidiophores, and the presence and absence of conidiophores as important diagnostic criteria. Thus, *Ellisembia* with distoseptate conidia was separated from *Sporidesmium* with euseptate conidia, with *E. coronata* (Fuckel) Subram. (≡ *Sporidesmium coronatum* Fuckel) designated as type species (Subramanian 1992). After Ellis (1971, 1976) made significant studies on *Sporidesmium*, many distoseptate species were later transferred to *Ellisembia*. Wu & Zhuang (2005), who expanded the generic concept of *Ellisembia* to include species with typically lageniform, ovoid or doliiform percurrently extending conidiogenous cells, also synonymized *Imicles* Shoemaker & Hambl. (Shoemaker & Hambleton 2001) with *Ellisembia*. Shenoy et al. (2006) recognized that species of the *Sporidesmium* complex (including *Ellisembia*) were polyphyletic. Since Subramanian (1992) established the genus *Ellisembia*, 47 species epithets have been added (MycoBank 2012).

The pristine natural forests, microhabitats, and tropical warm humid climate that prevail in the Western Ghats make it rich and diverse in fungal diversity (Bhat & Kendrick 1993, Rajeshkumar 2007). During 2010–11, expeditions were conducted to explore the microfungal diversity in natural forests and plantations of southern and northern Western Ghats (Rajeshkumar et al. 2011a,b, Singh et al. 2010). During one survey, an unusual saprobic *Ellisembia* species (sensu Wu & Zhuang 2005) was discovered on bamboo culms.

Materials & methods

Isolates and morphology— Conidia of the fungus were directly isolated from the surface of a dead culm and observed under a Nikon binocular stereomicroscope (Model SMZ-1500 with Digi-CAM, Japan). Cultures from single conidia were established on 2% potato dextrose agar plates (PDA; Crous et al. 2009). For morphotaxonomic studies and photomicrographs, Carl Zeiss (AXIO Imager 2, Germany) and Olympus (Model CX-41, Japan) microscopes were used. Conidia and conidiophores were mounted in lactic acid cotton blue and measured using an ocular micrometer, with 30 observations per structure. The measurements were also confirmed with the software available with the Carl Zeiss (AXIO Imager 2, Germany) microscope. Colony characteristics in culture were studied on two different media: 2% malt extract agar (MEA) and PDA (Crous et al. 2009). Colony colours were determined using Methuen Hand book of Colour (Kornerup & Wanscher 1981). A herbarium specimen was deposited in the Ajrekar Mycological Herbarium (AMH); a culture was accessioned and preserved in the National Fungal Culture Collection of India (NFCCI [WDCM-932]), Agharkar Research Institute, Pune, India.

Taxonomy

Ellisembia karadkensis Rajeshkumar & S.K. Singh, **sp. nov.** Figs 1–2

MycoBank MB 564202

Differs from all other *Ellisembia* species by its simple or Y-shaped branched conidia with long flagelliform apical appendages.

Type: India, Kerala, Kasaragod, Karadka. On decaying culms of *Bambusa bambos* (L.) Voss, November 2011, K.C. Rajeshkumar (**Holotype,** AMH 9446; ex-type culture NFCCI 2664.)

Etymology: *karadkensis;* referring to the collection locality Karadka, a village in the Kasaragod District.

Colonies brownish black, erumpent, mycelium consisting of pale to dark brown, septate, thin-walled, smooth hyphae, 2–3.5 µm wide. Conidiophores macronematous, mononematous, stout, straight or flexuous, erect, dark to blackish brown, arising from creeping hyphae, 1–6-septate, 17.5–81 × 3.5–8 µm. Conidiogenous cells monoblastic, integrated, terminal, lageniform or cylindrical, pale or dark brown. Conidial secession schizolytic. Conidia solitary, simple or branched, obclavate, mostly curved, tapering towards narrow whip-

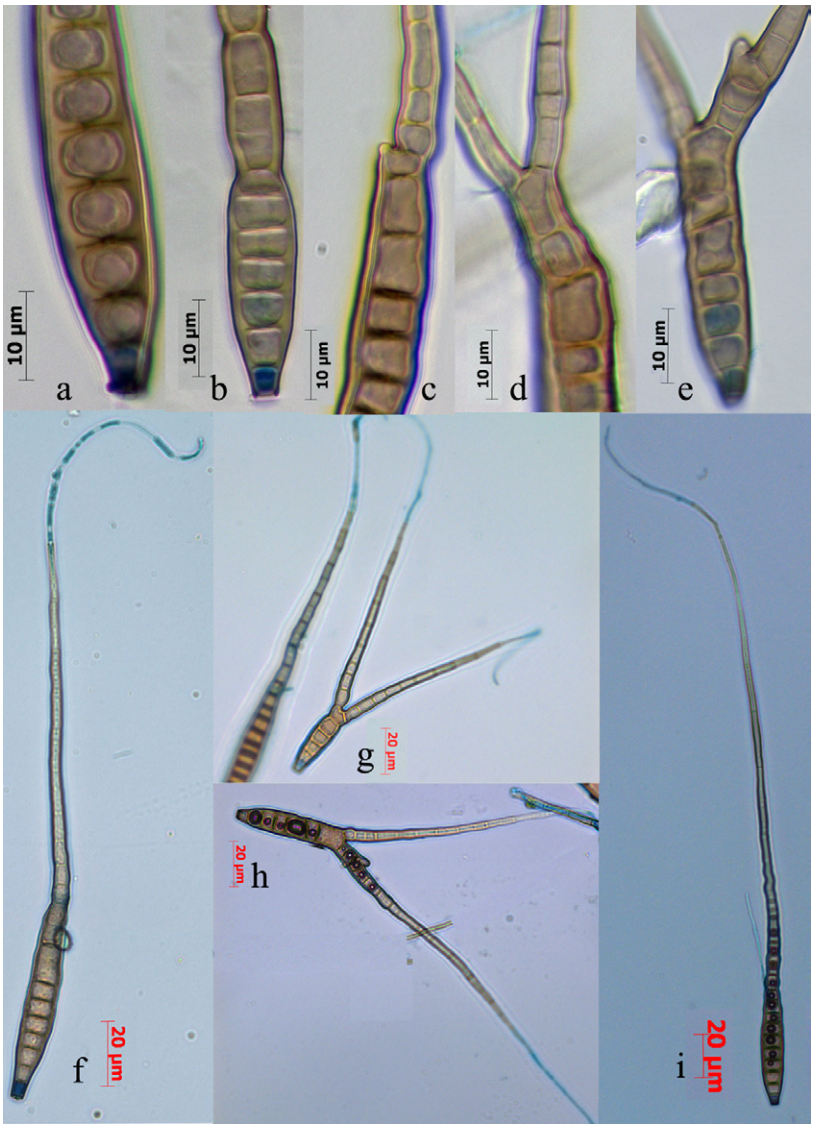

Fig. 1. *Ellisembia karadkensis* (holotype): a–b. Distoseptate conidial bases. c. Conidium with rudimentary branch initiation. d–e. Conidia with branches. f, i. Simple conidia with flagelliform apical appendages. g–h. Branched Y-shaped conidia.

like apical tip, 10–35-distoseptate, basal cells (up to 25th cell from base) are pale or olivaceous brown with dark septa, but apical cells are pale or hyaline with thin septa, walls thin and smooth; simple conidia, 150–345 × 9.5–12.5 µm,

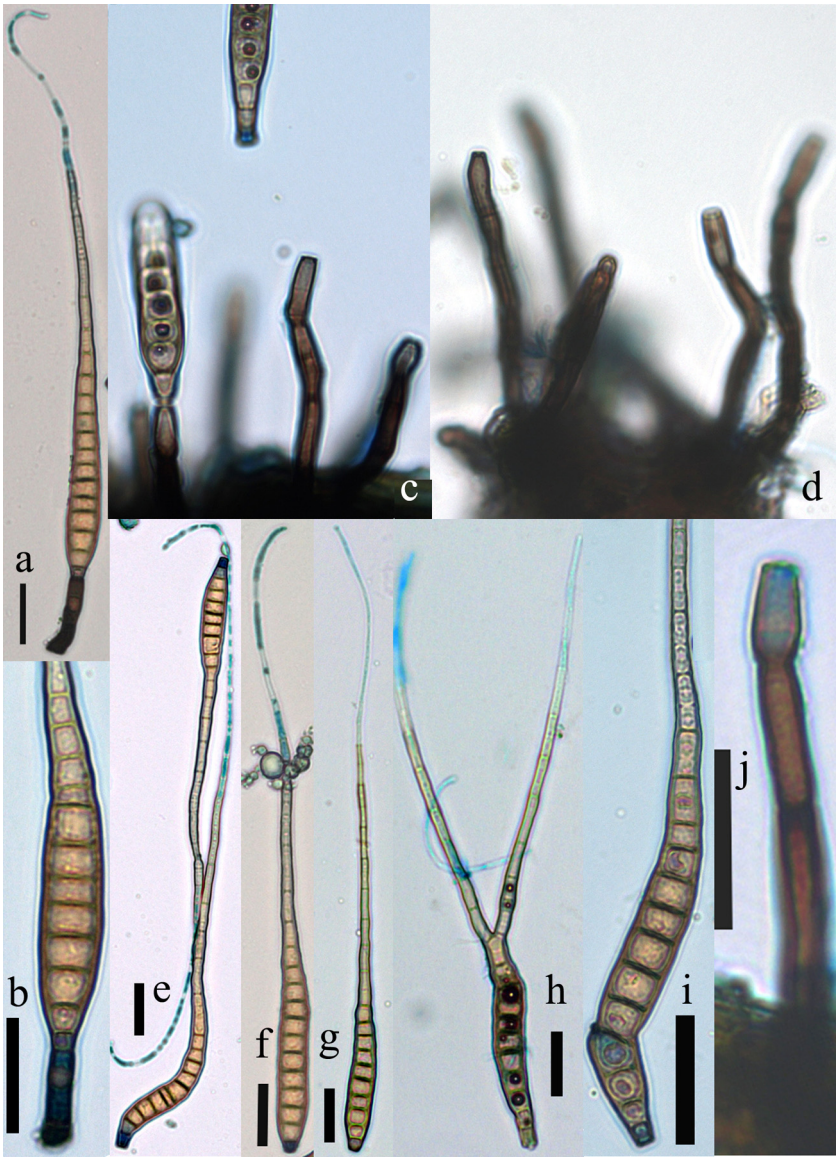

Fig. 2. *Ellisembia karadkensis* (holotype): a–b. Conidia attached to conidiophores. c–d. Conidiophores and conidial development. e–h. Variation in conidia. i. Conidium with curved base. j. Conidiophore with conidiogenous cell. Bars= 20µm.

conidial tip 1.5–2.7 µm wide, conidial base truncate, 3.2–5.5 µm wide; branched conidia Y-shaped, 190–250 × 9–10.7 µm, conidial tip 2–2.7 µm wide, conidial base 4–5.5 µm wide.

Teleomorph: not observed.

Colonies on PDA and MEA slow growing, 9–20 mm diam. at 25±2°C in 12 hours dark and 12 hours light conditions after 15 days, pale gray to dark gray (2D1), floccose, centrally umbonate; margin even; reverse dark grayish (1F1). Sporulation was not observed even after 30 days of growth.

Comments— Bamboo supports many *Ellisembia* species (McKenzie 1995, Mena et al. 2000, Wu & Zhuang 2005), and some species are known exclusively from *Bambusa* spp. These species are compared morphologically in Table 1.

Table 1. Comparison of *Ellisembia* species recorded on bamboos

Species	Conidiophores (µm)	Conidia (µm)	Source
E. bambusae	30–70 × 4–5	65–100 × 14–16, base 3–4.5	Wu & Zhuang (2005)
E. bambusicola	55–105 × 4–7	65–125 × 11–14, base 4–4.5	Mena-Portales et al. (2000)
E. bambusina	33–120 × 4.5–5.5	33–48 × 9–12, base 3–4	McKenzie (1995)
E. karadkensis	17.5–29.5 × 5.3–6.4	150–345 × 9.5–12.5, base 3.2–5.5	This paper

The conidia of *Ellisembia karadkensis* are morphologically similar to those of *E. podocarpi* Jian Ma & X.G. Zhang, *E. photiniae* Jian Ma & X.G. Zhang, *E. flagelliformis* (Matsush.) W.P. Wu, and *E. magnibrachypus* [≡ *Sporidesmium magnibrachypus*] (Matsushima 1975, Ma et al. 2010) in shape —especially in possessing simple hyaline flagelliform apices— and coloration. However, *E. karadkensis* conidia are longer and the Y-shaped branches have not been observed in these other species. The conidia of *E. magnibrachypus* may branch, but only in the hyaline, non-septate apical part (Matsushima 1975), whereas, in *E. karadkensis*, branched conidia are Y-shaped with a hyaline distoseptate apical tip. *Ellisembia magnibrachypus* also has shorter conidia (48–62 µm, excluding apical appendages that are ≤ 65 µm long; Matsushima 1975); in that species Matsushima (1975) considered the apical hyaline non-septate region as an apical appendage.

Neither Subramanian (1992) nor Wu & Zhuang (2005) considered *S. magnibrachypus* in their reassessments of *Sporidesmium,* even though it is a distoseptate species. Therefore, we propose a new combination here.

Ellisembia magnibrachypus (Matsush.) Rajeshkumar & S.K. Singh**, comb. nov.**

MycoBank MB 564216

≡ *Sporidesmium magnibrachypus* Matsush., Icon. Microfung. Matsush. Lect.: 138. 1975.

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